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ABSTRACT

The sample for this study included 496 students admitted to a large midwestern university through the special admissions program. Validity coefficients of the Descriptive Tests of Language Skills (DTLS) subtests, the Academic Tests of the ACT Assessment Program (ACT), and high school percentile rank were calculated with cumulative grade point average (GPA) at the end of each of 4 years of college. The best predictor of cumulative GPA was ACT composite score, although selected ACT subtests and DTLS subtests yielded statistically significant validity coefficients. High school percentile rank, traditionally a significant predictor in other studies, was not predictive of cumulative GPA at any time for this sample. Regression analyses for a subset of 138 of the special admissions students remaining in college after 4 years showed that, after the first year in college, DTLS subtests did not make a significant contribution to predicting academic success in college over and above the ACT subtests and high school rank. At the end of the first year, three DTLS subtests in combination contributed over and above the ACT subtests and high school rank. DTLS Vocabulary and Logical Relationships separately contributed over and above the ACT subtests, high school rank, and the other two DTLS subtests. (Author)

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The Validity of the ACT and Descriptive Tests of Language Skills for Developmental Students over a Four-Year College Program

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Abstract

The sample for this study included 496 students admitted to a large midwestern university through the special admissions program. Validity coefficients of the Descriptive Tests of Language Skills (DTLS) subtests, the Academic Tests of the ACT Assessment Program (ACT), and high school percentile rank were calculated with cumulative grade point average (GPA) at the end of each of four years of college. The best predictor of cumulative GPA was ACT composite score, although selected ACT subtests and DTLS subtests yielded statistically significant validity coefficients. High school percentile rank, traditionally a significant predictor in other studies, was not predictive of cumulative GPA at any time for this sample. Regression analyses for a subset of 138 of the special admissions students remaining in college after four years showed that, after the first year in college, the DTLS subtests did not make a significant contribution to academic success in college over and above the ACT subtests and high school rank. At the end of the first year, the three DTLS subtests in combination contributed over and above the ACT subtests and high school rank. Also, the DTLS Vocabulary and DTLS Logical Relationships separately contributed over and above the ACT subtests, high school rank, and the other two DTLS subtests.

The Validity of the ACT and Descriptive Tests of Language Skills for Developmental Students over a Four-Year College Program

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College admission procedures vary from institution to institution. Special admissions programs admit students to college who have lower high school grades and entrance test scores than those admitted by traditional procedures, but who have the potential for satisfactory work. However, access to college does not mean success in college. To fulfill the social responsibility that accompanies special admissions, many schools have established programs of supportive services to students. These developmental and support programs provide coursework in basic skills areas intended to compensate for inadequate preparation. With the addition of these courses, placement decisions become necessary. Appropriate tests need to be used whose content closely resembles the course content of the institution and whose predictive value may add to the knowledge we already have about the student.

Students at most postsecondary institutions are required to take an entrance examination, such as the Academic Tests of the ACT Assessment (American College Testing Program, 1981). Several recent studies (Merrit, 1972; Pedrini & Pedrini, 1977; Rowan, 1978; Stiggins, Schmeiser, & Ferguson, 1978) have shown the ACT to be a fairly effective predictor of grade point

average (GPA) for students of different social classes attending a wide variety of postsecondary institutions. Others (Loeb & Mueller, 1970; Price & Kim, 1976) have found the best two-predictor combination for GPA was high school percentile rank and ACT composite. In addition, Carney and Geis (1981) suggested that ACT test data can be useful for determining the need for reading instruction at the college level.

Most research on the prediction of academic performance in college has limited the criterion to performance in the first semester, quarter, or year of college work. However, special admissions committees, basic skills program administrators, as well as college admissions officials are concerned not only with first-year success, but success over four years.

Once a student is admitted to a university through a special admissions program, some institutions provide further testing to determine placement into basic skills courses. One set of tests, the Descriptive Tests of Language Skills (DTLS) (Educational Testing Service, 1978), is purported to help identify students who may need special assistance in reading and language usage. The purpose of this investigation was to determine whether the addition of reading and language tests could improve on the long-term predictive validity already demonstrated by the ACT and high school percentile rank for academically underprepared students.

Method

Subjects

The subjects for this investigation included all freshmen (n = 496) who were admitted to a large midwestern university through the special admissions program for Fall Semester, 1978. Special admissions students agreed to participate in reading, writing, mathematics, and speech classes, labs, workshops, and tutorials during their freshman year. Composite ACT scores on the four ACT tests ranged from 4 through 20 with a mean close to 13.

Instruments

The instruments used were three subtests of the Descriptive Tests of Language Skills and the four subtests of the ACT. The DTLS subtests utilized in this study were: Reading Comprehension, Vocabulary, and Logical Relationships. The Academic Tests of the ACT Assessment Program consist of four subtests entitled English Usage, Mathematics Usage, Social Studies Reading, and Natural Sciences Reading. The ACT composite is an average of the four Academic Tests.

Independent Variables

The independent (predictor) variables employed in the predictive validity portion of this study were: DTLS Reading Comprehension Test, DTLS Vocabulary Test, DTLS Logical Relationships Test. DTLS total score (the raw score total of the three DTLS

subtests), ACT English Usage Test, ACT Mathematics Usage Test, ACT Social Studies Reading Test, ACT Natural Sciences Reading Test, ACT composite (an average of the four Academic Tests), and high school percentile rank.

Dependent Variables

The dependent variables were: Cumulative grade point average, measured at the end of first year, end of second year, end of third year, and end of fourth year in college. Cumulative GPA refers to a student's mean grade for all subjects taken up to the time of measurement.

Procedure

Data were collected on special admissions students who matriculated Fall Semester, 1979. Subjects were administered the DTLS subtests after their admission to the university and before their matriculation in Fall, 1978. Testing occurred on the mornings of the students' advisement appointments throughout the summer of 1978, in groups of approximately 20 each.

Data on ACT scores, high school rank, and GPA for subsequent years in college were collected for each subject. The ACT test is a requirement for admission to the university; hence, students may have taken the ACT at different times and places during their senior year in high school.

Research Questions

1. How much variance in cumulative GPA by year for each of the four years in college can be accounted for by: (a) DTLS

subtest scores, (b) DTLS total score, (c) ACT subtest scores, (d) ACT composite score, and (e) high school percentile rank?

2. What is the contribution of each individual DTLS subtest over and above the contribution of the ACT subtest scores, high school percentile rank, and the other DTLS subtest scores for GPA for each year of college?

3. What is the contribution of the set of DTLS subtests over and above the ACT subtest scores and high school percentile rank for GPA for each year in college?

4. What is the contribution of high school percentile rank over and above the ACT and DTLS subtest scores for each year in college?

Data Analysis

Research question 1 was answered through the calculation of Pearson product-moment correlation coefficients.

The remaining research questions were answered using the general linear model. Regression analysis techniques were used, and two regression equations were constructed: a full model and a restricted model for each question. The full model contained all the variables that may contribute to the prediction of the dependent variable. The restricted model for each question contained all the variables except the one(s) under study.

An F statistic based on these two regression equations was calculated to determine if excluding the variable or set

of variables resulted in a significant decrease in the predictability of GPA for each year in college. The level of significance chosen for this study was .05.

Results and Discussion

Internal consistency reliability was calculated for the DTLS subtests in this study using the Kuder-Richardson formula 21. Coefficients were .78 for Reading Comprehension, .63 for Vocabulary, and .79 for Logical Relationships.

Intercorrelations among the ten predictor (Variables 1-10) and the four criterion (Variables 11-14) measures are shown in Table 1. The ACT composite predicted all four criteria of academic success more accurately than did DTLS subtests, ACT subtests, or high school percentile rank. This result was consistent with the findings of other previously published studies involving prediction of college performance with ACT test scores. Validity coefficients were low, ranging from .23 to .32. DTLS total was a significant predictor of cumulative GPA for the first three years in college, indicating that reading and language usage was a significant predictor of the criterion variables. Coefficients for this variable were slightly smaller than the ones for ACT composite. The DTLS subtests and the ACT subtests seem to predict about equally for the first three years of college. It is interesting to note that the ACT Mathematics Usage score had a coefficient of .29, one of the larger validity coefficients, for both third and fourth

year GPA. The high school percentile rank predictor yielded negative or non-significant validity coefficients for all four criterion variables. This is in apparent contradiction to the information found in previously published studies, which show high school percentile rank to be a significant predictor of academic success in college (Loeb & Mueller, 1970; Price & Kim, 1976).

In creating the full model for the regression analyses, variables identified as being potentially important predictors of achievement in college were included. The amount of variance in cumulative GPA at the end of the first year in college accounted for by: (a) ACT Mathematics Usage subtest score; (b) ACT English Usage subtest score; (c) ACT Social Studies Reading subtest score; (d) ACT Natural Sciences Reading subtest score; (e) DTLS Reading Comprehension subtest score; (f) DTLS Vocabulary subtest score; (g) DTLS Logical Relationships subtest score; and (h) high school percentile rank was .17. (See Table 2.) At the end of the second year in college, the R^2 for the full model was .09; at the end of the third year, .14; and, at the end of the fourth year, .12.

DTLS Vocabulary and DTLS Logical Relationships subtests made a significant contribution over and above the other seven variables in combination for first year cumulative GPA only. The set of three DTLS subtests made a significant contribution over and above the other five variables for first year GPA. After first year in college, none of the variables under

investigation contributed over and above the other predictor variables in combination.

Based on the findings of this study, it is suggested that further testing of basic skills students appears to be unnecessary if long-term prediction of student success, as demonstrated by cumulative GPA, is the desired criterion. Information supplied by the ACT test data appears to be the best predictor. However, because of the moderate validity coefficients and small R^2 values, other cognitive and affective variables need to be investigated with regard to their predictive validity toward cumulative GPA. Other investigators have studied such measures as self-concept and other personality variables (Peterson, 1973), as well as attitudinal variables (Trachtman, 1975) as predictors of academic success. Further research is planned to include other cognitive and affective measures in investigating the prediction of success and persistence in college.

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Table 1

Correlation Matrix, Means, Standard Deviations, and Maximum Values for Each Variable

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	N	M	SD	Possible Maximum Value
1. ACT English Usage Score														488	13.85	4.05	33
2. ACT Mathematics Usage Score	23*													488	11.65	4.90	36
3. ACT Social Studies Reading Score	40*	21*												488	11.73	4.07	34
4. ACT Natural Sciences Reading Score	42*	23*	45*											488	15.90	4.57	35
5. ACT Composite Score	70*	63*	70*	75*										488	13.38	3.08	33
6. DTLS Reading Comprehension Score	51*	23*	43*	39*	56*									379	30.30	6.60	45
7. DTLS Vocabulary Score	46*	06	33*	34*	42*	55*								376	17.52	4.40	30
8. DTLS Logical Relationships Score	55*	19*	43*	44*	58*	73*	60*							377	34.08	7.22	50
9. DTLS Total Raw Score	59*	20*	47*	46*	61*	89*	77*	92*						373	81.88	15.97	125
10. High School Percentile Rank	-10*	-16*	-22*	-20*	-25*	-14*	-10	-11*	-14*					478	49.27	22.81	99
11. GPA at end of 1st Year (1979)	28*	22*	14*	22*	30*	26*	06	22*	22*	08				442	2.052	0.70	4.000
12. GPA at end of 2nd Year (1980)	20*	18*	02	19*	23*	15*	00	13*	12*	04	78*			318	2.198	0.48	4.000
13. GPA at end of 3rd Year (1981)	18*	29*	14*	19*	32*	23*	09	23*	23*	-00	59*	83*		212	2.317	0.41	4.000
14. GPA at end of 4th Year (1982)	13	29*	13	20*	30*	15	-07	15	11	-02	51*	72*	91*	192	2.391	0.38	4.000

Note: Items 1-4 are subtest scores of the Academic Tests of the ACT Assessment (American College Testing Program). Item 5 is ACT composite score (an average of the four Academic Tests). Items 6-8 are subtest scores of the Descriptive Tests of Language Skills (DTLS). Item 9 is DTLS total raw score (the sum of the three DTLS subtests). Scores for DTLS tests are raw scores; ACT test scores are standard scores. Items 11-14 are cumulative grade point averages at the end of each year in college. Items 11-14 are criterion measures; all others are predictors. Decimal points for correlations have been eliminated.

*$p < .05$.

Table 2

Summary of Regression Analyses for Four Years of College

Model	Variables Included in Model[a]	Variable(s) Eliminated from Model	First Year-1979				Second Year-1980				Third Year-1981				Fourth Year-1982			
			R^2	Reduc. in R^2	df	F	R^2	Reduc. in R^2	df	F	R^2	Reduc. in R^2	df	F	R^2	Reduc. in R^2	df	F
Full	1,2,3,4,5,6,7,8	0	.1711		8,129	3.33[b]	.0857		8,129	1.51	.1391		8,129	2.61[b]	.1244		8,129	2.29[b]
Restricted Model 1	1,2,3,4,8	5,6,7	.0715	.0996	3,129	5.17[b]	.0590	.0267	3,129	1.26	.1087	.0304	3,129	1.52	.1130	.0114	3,129	0.56
Restricted Model 2	1,2,3,4,6,7,8	5	.1671	.0040	1,129	0.63	.0855	.0002	1,129	0.03	.1390	.0001	1,129	0.01	.1243	.0001	1,129	0.01
Restricted Model 3	1,2,3,4,5,7,8	6	.1396	.0315	1,129	4.90[b]	.0773	.0084	1,129	1.19	.1271	.0120	1,129	1.79	.1153	.0091	1,129	1.34
Restricted Model 4	1,2,3,4,5,6,8	7	.1085	.0626	1,129	9.75[b]	.0662	.0195	1,129	2.75	.1155	.0236	1,129	3.54	.1202	.0042	1,129	0.62
Restricted Model 5	1,2,3,4,5,6,7	8	.1477	.0234	1,129	3.64	.0788	.0069	1,129	0.97	.1303	.0088	1,129	1.32	.1159	.0085	1,129	1.25

Note: The dependent variable is grade point average at the end of each year in college. N = 138.

[a]1 = Academic Tests of the ACT Assessment English Usage subtest score; 2 = ACT Mathematics Usage subtest score; 3 = ACT Social Studies Reading subtest score; 4 = ACT Natural Sciences Reading subtest score; 5 = Descriptive Tests of Language Skills (DTLS) Reading Comprehension subtest score; 6 = DTLS Vocabulary subtest score; 7 = DTLS Logical Relationships subtest score; 8 = Percentile rank in high school graduating class.

[b]The reduction in R^2 was statistically significant at the .05 level of significance.